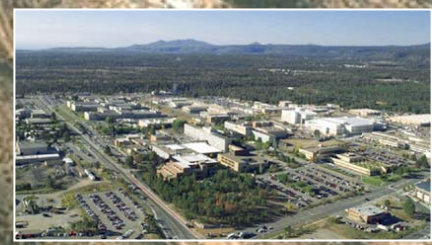
Los Alamos National Laboratory

Pre Solicitation Conference

NNSA Source Evaluation Board

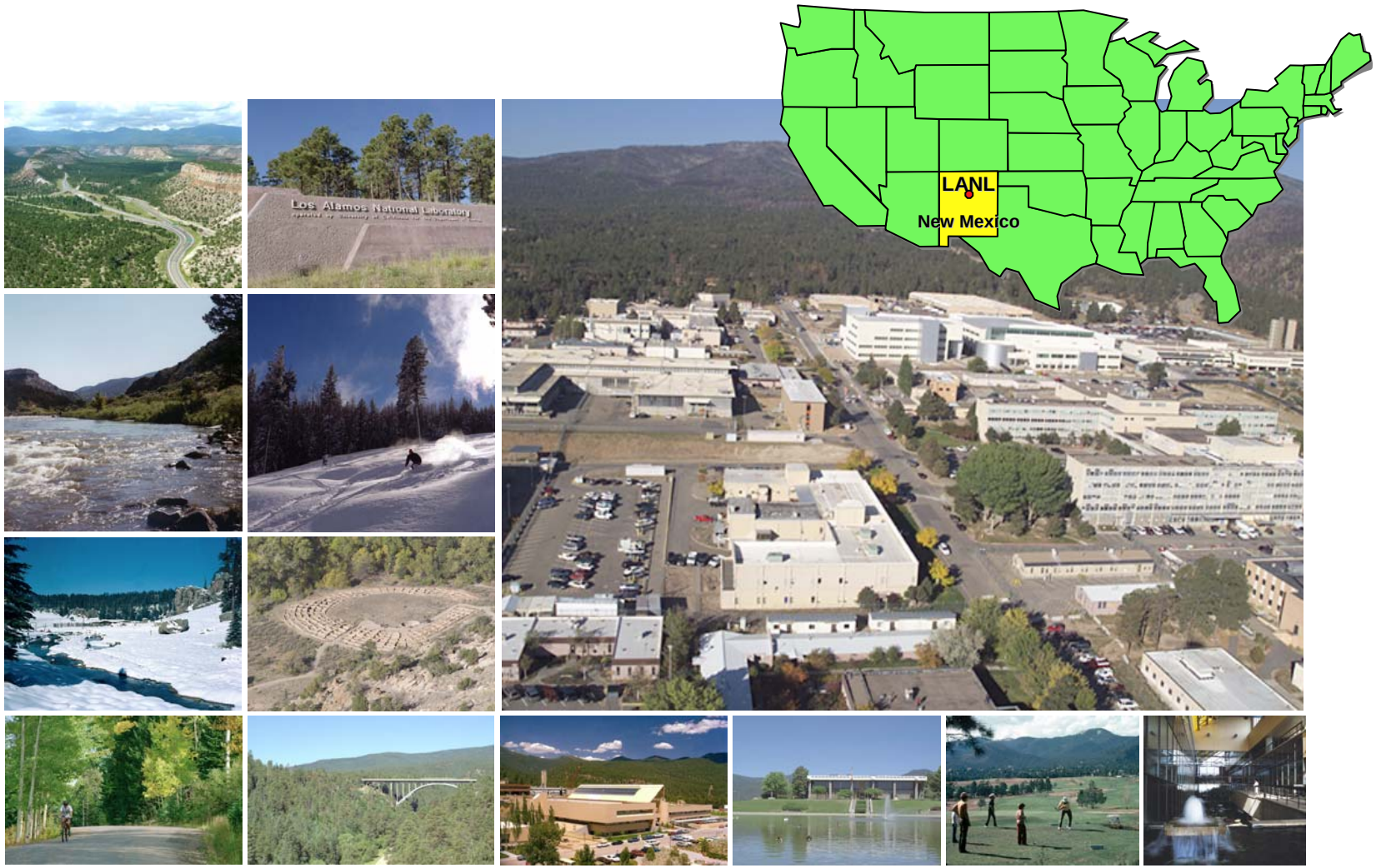
December 14, 2004

David H. Crandall



Los Alamos New Mexico

National Nuclear Security Administration



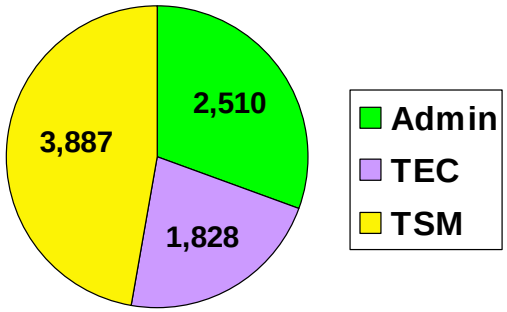
Los Alamos National Laboratory is a Large and Complex Site

- 38 square miles
- Over 2,000 buildings with approx. 9 million sq. ft.
- 100 miles of paved roads
- 30 miles of 115 kV transmission lines
- 120 miles of gas transmission lines
- 14 nuclear facilities
- Replacement cost $5.6 billion

Current LANL Workforce

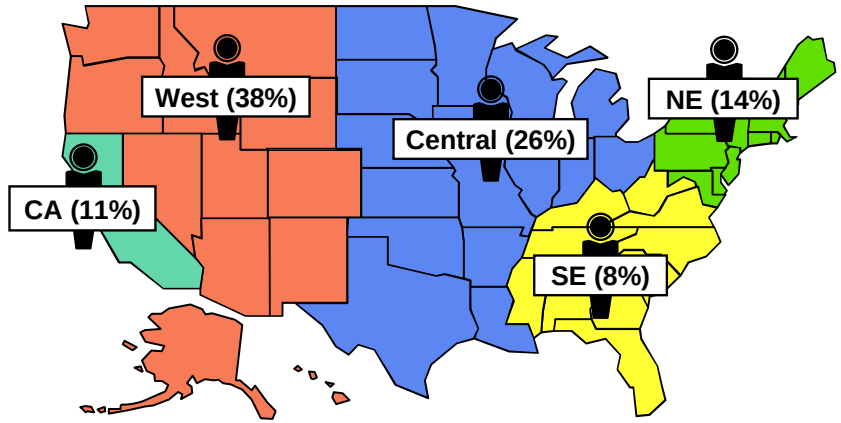
Current Workforce

Regular UC Total 8,225



Technical Staff Members from 733Campuses Across the US

Data 9/30/04

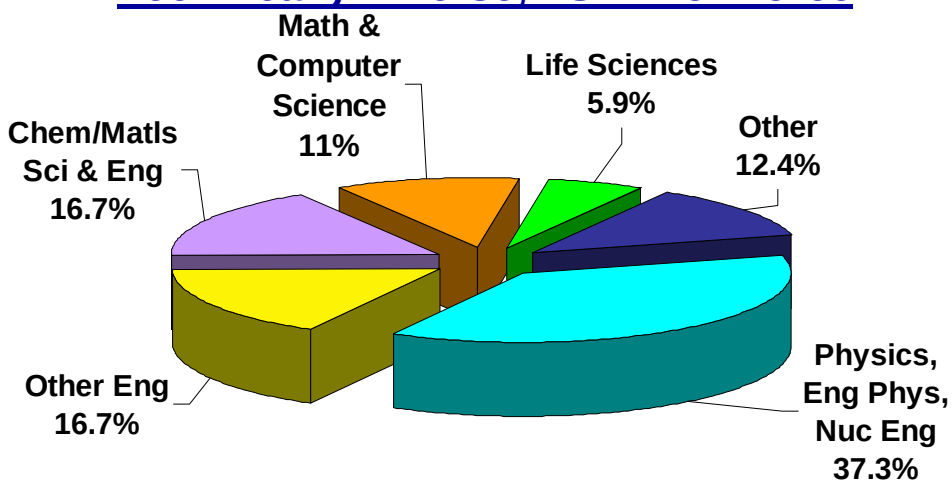


Students

• Grad	375
• Undergrad	881
• HS Co-op	65
Total	1,321

Post Docs 386

Technically Diverse, TSM Workforce



National Nuclear Security Administration

Vision: **Provide the nation an integrated nuclear security complex, consisting of R&D, engineering, test, and production facilities that operates a NNSA capability that is recognized as preeminent in personnel, technical leadership, planning, and program management.**

Defense Program Mission: **To strengthen and support United States' security through nuclear deterrence by the capability to:**

- **Maintain a safe, secure, reliable and effective nuclear weapons stockpile.**
- **Maintain a flexible, responsive, robust nuclear weapons complex to address new challenges.**
- **Execute R&D and test activities to support U.S, leadership in science and technology.**
- **Work with the Department of Defense to transform the cold war stockpile to meet the needs of the 21st century.**

Addressing the Proliferation Threat in All of Its Dimensions

National Nuclear Security Administration

<u>Nuclear Nonproliferation Mission:</u> detect, prevent, and reverse the proliferation of weapons of mass destruction (WMD), while mitigating the risks from nuclear operations.

Conducts cutting-edge nonproliferation and national security research and development;

Secures nuclear materials, nuclear weapons, and radiological materials at potentially vulnerable sites in Russia and elsewhere;

Removes vulnerable materials worldwide;

Reduces quantities of nuclear and radiological materials;

Bolsters border security overseas;

Supports international nonproliferation and export control regimes;

Downsizes the nuclear weapons infrastructure of the former Soviet Union; and

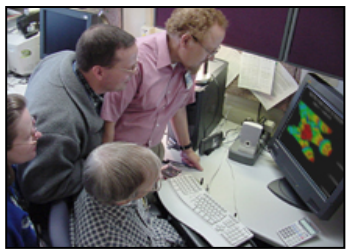
Mitigates risks at nuclear facilities worldwide.

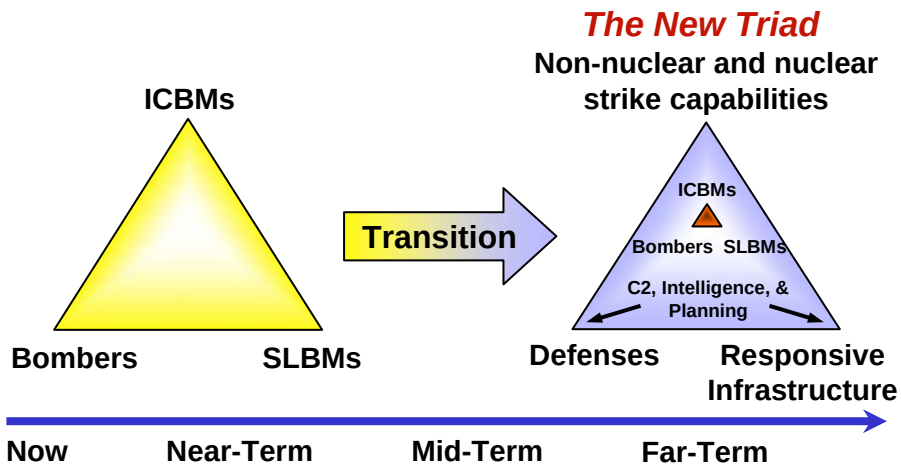


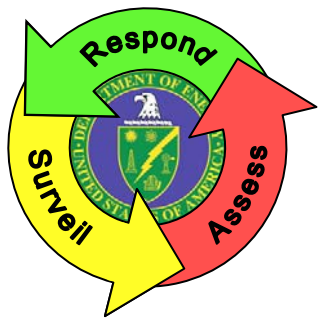


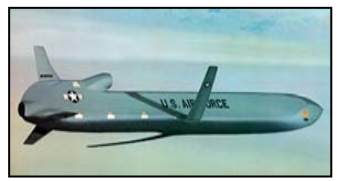
Ensure the Safety and Reliability of the U.S. Nuclear Deterrent

National Nuclear Security Administration





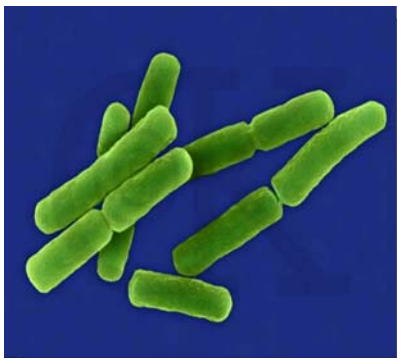




Nuclear weapons remain critical to the security of our nation.

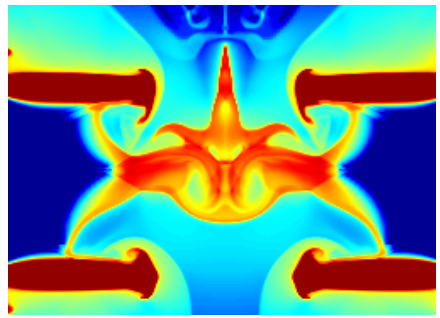
Serving the Nation by Applying Science & Developing Technology for National Security

National Nuclear Security Administration

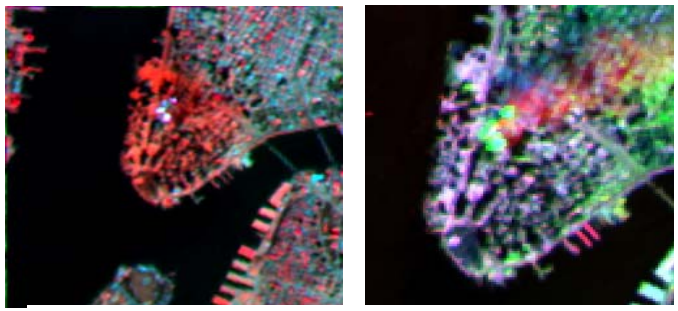


Advanced Characterization of Biological Agents

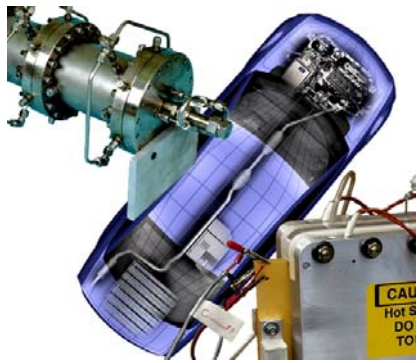
B61-11



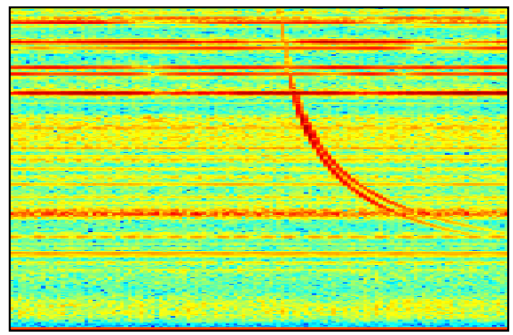
Large-Scale Simulation Stockpile Stewardship



Multispectral Thermal Imager satellite



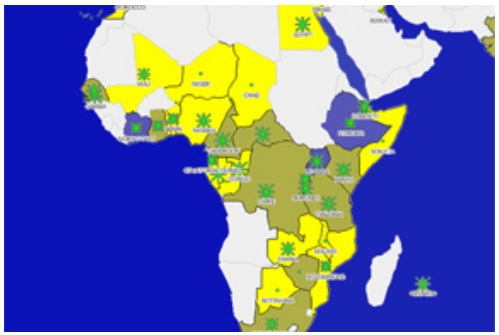
Fuel Cell



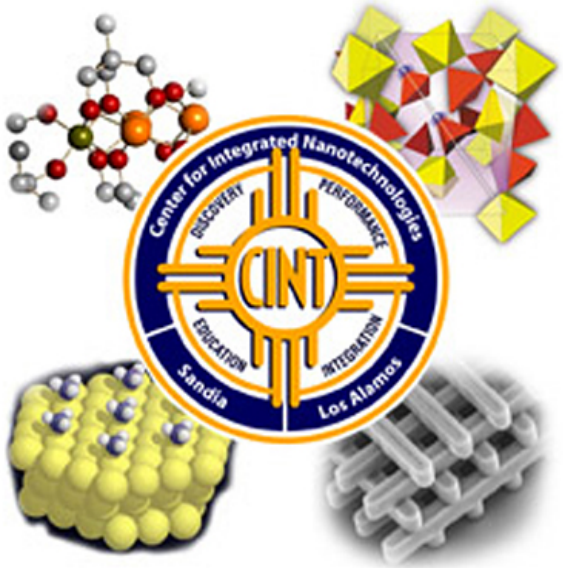
Fast On Orbit Recording of Transient Events

Cutting-edge Research Has Always Been a Vital Part of the Laboratory

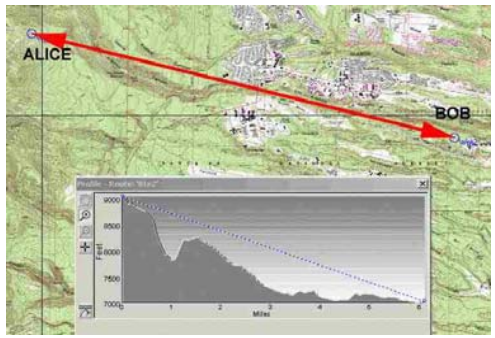
National Nuclear Security Administration



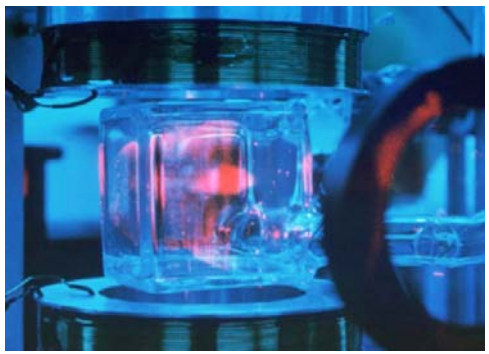
HIV Research



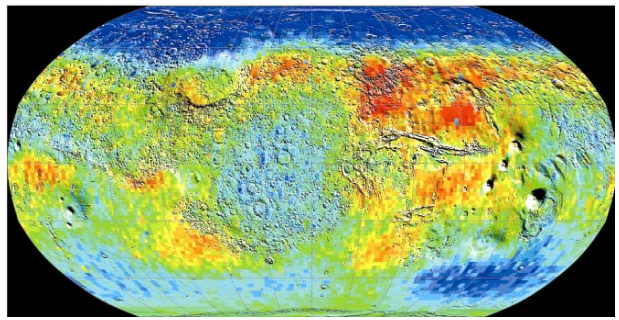
Nanoscience



Quantum Systems



Atom Trapping and Cooling



Neutron Spectrometer
Map of Mars

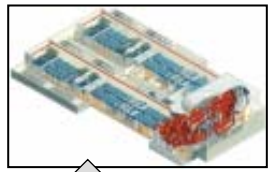
Science underpins all missions.

Stockpile Stewardship R&D Strengthening Science-Based Methods

National Nuclear Security Administration

Adv. Hydro Capability

National Ignition Facility



Arming, Fuzing, Firing

HE Detonation

Implosion

Fission Burn

Boosted Burn

Radiation Flow

Implosion

Burn/Explosion

Effects

Nuclear Output

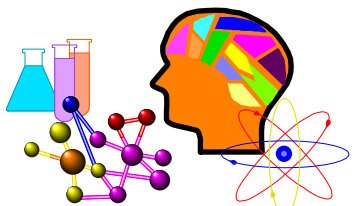
Assessment and Certification

Primary Initiation

Primary Yield

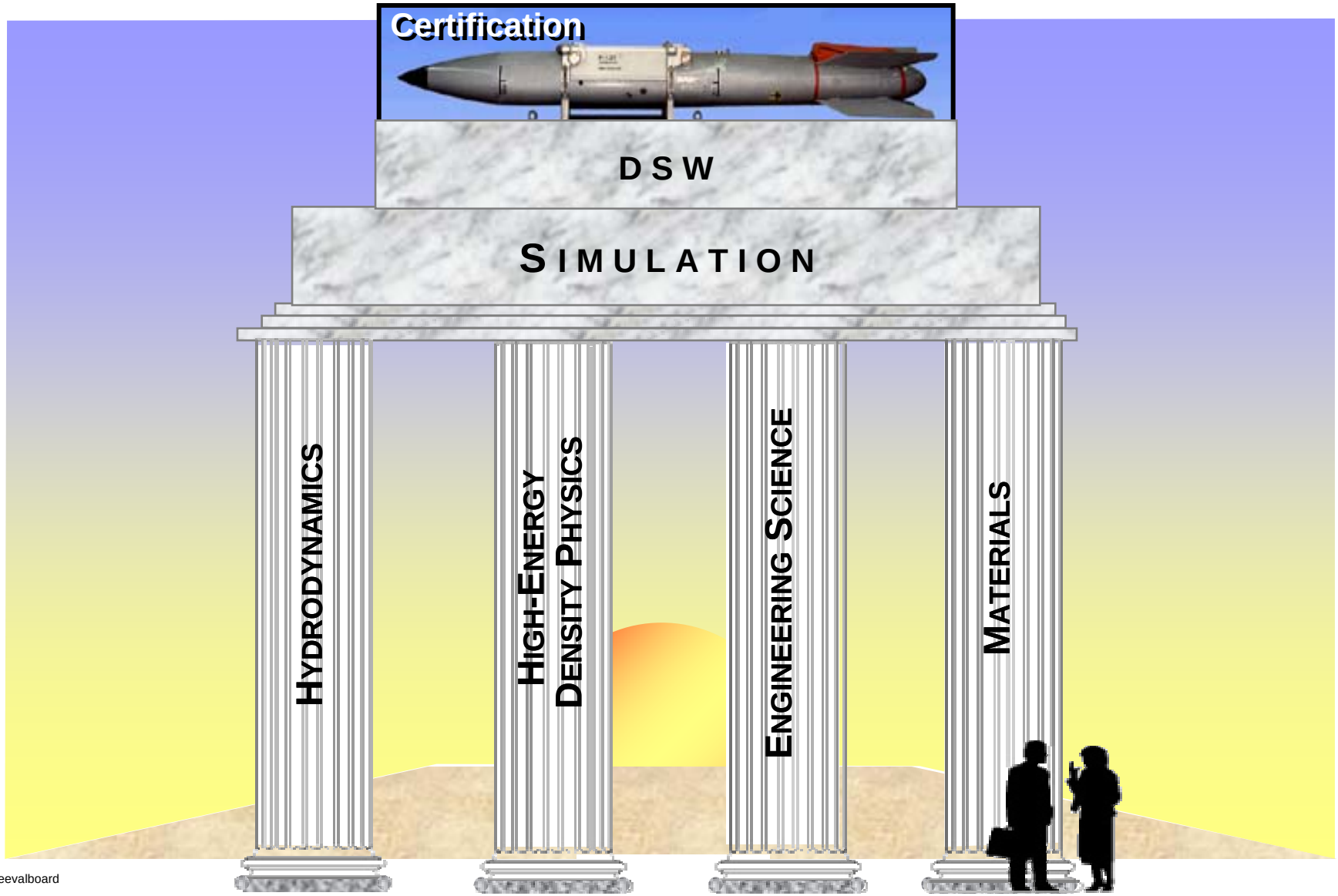
Secondary Yield

Safety/Security/Use Control…System Integration (Stockpile to Target)



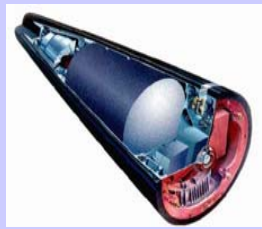
Materials and Chemistry

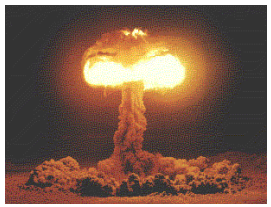
Pillars of Science Converging on Certification



Supporting Engineering and Readiness

A reliable stockpile requires an integrated Campaign Program to support weapon delivery and the Stockpile Stewardship Plan

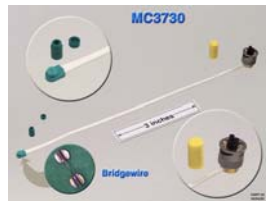




Nuclear Survivability

Weapon Output& Radiation Hardening

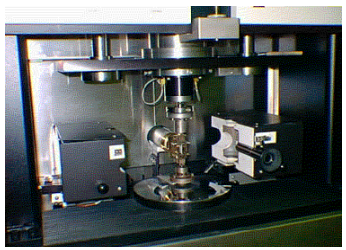
Non Nuclear Readiness and ADAPT



Detonator Cable HE Loading / Microclad Supplier

Engineering and Readiness Activities that support stockpile

Enhanced Surveillance

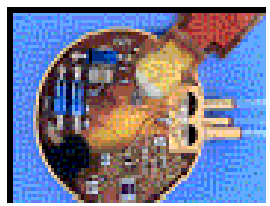


Aging Assessment

Weapons Systems Engineering

High Explosive Radio Telemetry

Enhanced Surety



Advanced Initiation

Pit Manufacturing and Certification

National Nuclear Security Administration

Pit Manufacturing

- Reorganize activities and process lines at TA-55
- Manufacturing ten pits per year in FY2007

Pit Certification

- Issues Major Assembly Release for W88 Warhead

Pit Manufacturing Capability

- Develop technologies to manufacture pit types other than the W88
- Produce significantly less waste and radiation dose at lower cost and more efficiently compared to Rocky Flats

Modern Pit Facility

- Develop a responsive pit manufacturing infrastructure

Nevada Test Site Support

- Conduct follow-on subcritical experiments to confirm nuclear performance of the W88 pit

Nuclear Weapons

National Nuclear Security Administration


B61 LEP and Enduring Systems

LANL supports the NNSA goal to ensure that our nation's nuclear weapons continue to serve their essential deterrence role by maintaining and enhancing the safety, security, and reliability of the stockpile without nuclear testing.

W80 Peer Review

W88 Enduring System


W78 Enduring System


W76 LEP and Enduring Systems

Nuclear Weapons

National Nuclear Security Administration

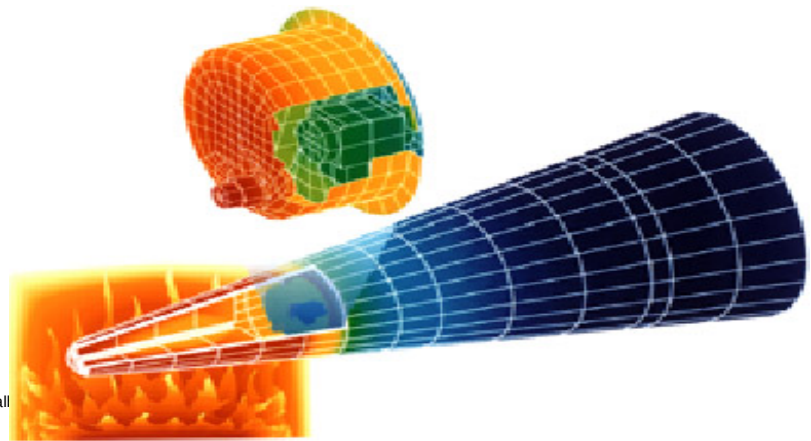
Life Extension Programs

B61 – Secondary Replacement

W76 – Primary, Secondary refurbishment

Research, Design, and Development

- Small, intermediate, and full scale tests
- Modeling and simulation
- Qualification / Certification
- Engineering Releases



Manufacturing and Production Support

- Savannah River Site – Gas Transfer System Loading
- Pantex – Assembly / Disassembly
- Kansas City Plant – Non-nuclear components
- Y-12 Plant – Cases and secondary
- Los Alamos National Laboratory – Detonator production and neutron target tube loading

Strong Focus on Homeland Security

National Nuclear Security Administration

Center for Homeland Security
LOS ALAMOS NATIONAL LABORATORY

Engage the Laboratory's S&T capabilities broadly in applications to homeland security challenges

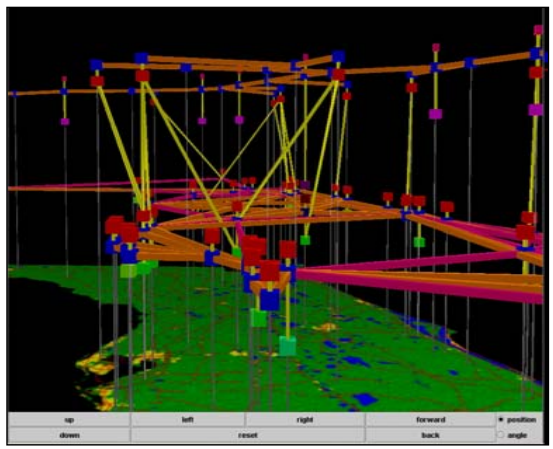
Focus Areas:

- **Radiological and nuclear threats**
- **Chemical and biological threats**
- **Critical infrastructure protection**

Base Inspection Technology

Nuclear Response

Biological Aerosol & Sentry Information System



National Infrastructure Simulation & Analysis Center

ARACOR Eagle Radiography System

Work For Others

FY 04 WFO Funding (Obligations) - $186M
Major Sponsors

National Nuclear Security Administration

DoD
38% of WFO

Sample Tasks
- Directed Energy Technology
- Advanced Multifunctional Films
- High Power Microwave Technology
- Hydrogen Fuel Cell Technology
- Advance Sensor Technology
- Bio Defense
- Weapons Infrastructure Assurance Analysis
- Energetic Materials
- Modeling and Simulation

DHS
24% of WFO

Sample Tasks
- Critical Infrastructure Protection Analysis Support
- Radiological and nuclear Countermeasures
- Bio-agent Surveillance Development
- Chemical Detection Technology Development

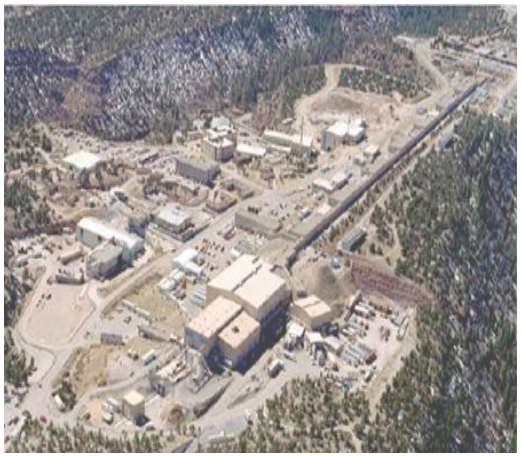
Other Federal Sponsors
27% of WFO

Sample Tasks
- HIV Sequence Database and Analysis
- Radiation Monitoring Technology
- Plasma Science Investigations
- Radioisotope Power
- Nuclear Fuel Service Vulnerability
- Extra terrestrial Studies Using Nuclear Interactions
- High Performance Conducting Polymer Actuators

Non-Federal Sponsors
11% of WFO

Sample Tasks
- Non Destructive Assay Equipment Data Collection Hardware
- Membrane-Electrode Assembly
- Development of the Miniaturized Laser Igniter System
- Thermo Acoustic Natural Gas Liquefier
- Morphology and Spectra-based Analysis of Tissue Sections

LANL R&D Facilities



TA-53: Los Alamos Neutron Science Center (LANSCE)

TA-3: Nicholas C. Metropolis Center for Modeling and Simulation

TA-18: Pajarito Site

TA-15: Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility

TA-22: High Explosives Detonator Facility

LANL Production Facilities

TA-3: Chemistry and Metallurgy Research (CMR) Facility

TA-3: Beryllium Technology Facility (BTF)

TA-16: Weapons Engineering Tritium Facility (WETF)

TA-55: Plutonium Facility Site

LANL Construction Projects

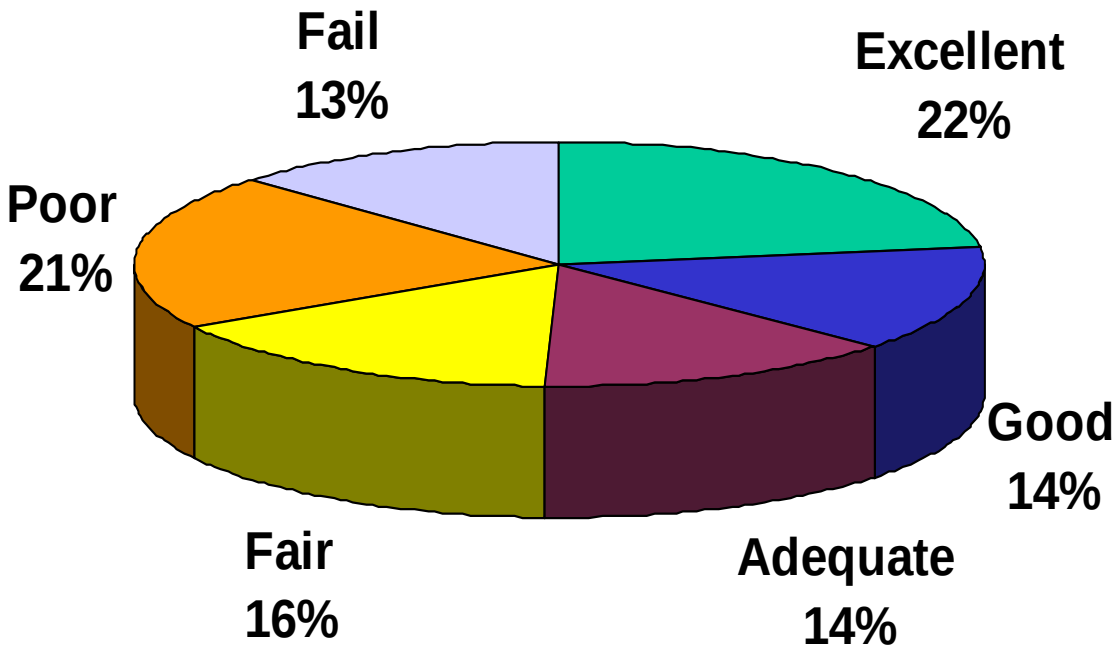
Project	Scope	Total Project Cost	Estimated Completion	Status
Partial Site-Wide Fire Alarm Replacement Project (01-D-701)	Replace fire alarm infrastructure at various locations	$28M	FY2006	Under construction
Waste Management Risk Mitigation Project (01-D-703)	Construct influent tank to collect radioactive liquid waste during an emergency	$25M	FY2006	Under construction
National Security Sciences Building / LANL Administrative Building (03-D-102 /04-D-104)	Replace SM-43 building	$122M	FY2007	Under construction
CMR Replacement (04-D-125)	Construct new CMR facility at TA-55	$702M	FY2012	Completing conceptual design

LANL Construction Projects (cont.)

Project	Scope	Total Project Cost	Estimated Completion	Status
Criticality Experiments Facility (04-D-128)	Transfer TA-18 missions to Nevada	$148M	FY2009	Conceptual design complete; starting detailed design
Security Perimeter Project (05-D-701)	Construct by-pass road around TA-3	$32M	FY2007	Conceptual design complete; starting detailed design
Nuclear Material Safeguard and Security Upgrade Project (NMSSUP), Phase II (05-D-170.1)	Upgrade security infrastructure at TA-55	$240M	FY2011	Conceptual design underway
Power Grid Infrastructure Upgrade (05-D-602)	Construct redundant power transmission line	$20M	FY2007	Conceptual design complete; starting detailed design

LANL Facility Condition

Total square footage = 8,914,275



Projected site-wide facility condition index (FCI) = 9.5%

Projected deferred maintenance = $501M

NNSA View Toward the Future of LANL

- **LANL is a critical national resource of exceptional scientific and technological prowess.**
- **Modern management approaches must be applied for planning and execution of program deliverables and for efficiency of operations.**
- **There must be adequate rigor in safety and environmental compliance at LANL.**
  - **"The goal should be zero"**
    - **Accidents**
    - **Environmental violations**
- **Information security should not be too reliant on individual personal integrity.**

NNSA Expectations for LANL – Science and Security

- **A safe and secure environment for high risk/consequence research and development supporting national security.**
- **Efficient operations of challenging facilities to enable safe and secure science.**
- **Today's mission activities are extended and tomorrow's are enabled.**
- **At least half of the work level is for NNSA missions:**
  - **A broad spectrum of compatible and synergistic other work is up to one-half the work load**
- **The contractor is recognized for valuable and critical contributions to national security and that reputation has value to the contractor.**

NNSA Expectation for LANL - Cooperation

- **Effective teaming with other entities to address national missions and broad public value:**
  - **LLNL and SNL labs for NNSA mission.**
  - **Nevada Test Site, a primary resource for LANL.**
  - **NNSA's plants where technical guidance from LANL is required and schedules matter.**
  - **Other DOE contractors and universities particularly for fundamental science.**
  - **Departments of Defense and Homeland Security for their national security missions.**
  - **Other federal and state governmental agencies.**
  - **Commercial enterprise to transfer technology for broad public value.**
  - **Local community enhancement (schools, infrastructure, environment…).**

NNSA Expectation for LANL – Plans and Schedules

- **Improved planning and costing for program deliverables and projects:**
  - **Provide basis for costs and schedules that support. predictability for Program planning on 5 year time scales.**
  - **Follow and enhance NNSA project procedures and process.**
  - **Foresee life cycle costs for all program commitments.**
  - **Understand and articulate LANL roles and responsibilities within broad context of NNSA mission and national security.**
- **Execute project management that provides early warning for cost and schedule problems enabling corrective response before breaches.**

LANL Performance Priorities

Top 5 performance priorities provide a framework for LANL work over the next 10 years:

- **Safety, security, compliance, and environment.**
- **National security mission:**
  - **Nuclear weapons**
  - **Threat reduction**
- **Fundamental science that supports the mission.**
- **Improved business operations and management practices.**
- **Community partnerships.**